



DEPARTMENT OF ENVIRONMENT AND CONSERVATION DIVISION OF UNDERGROUND STORAGE TANKS

UST SYSTEM CLOSURE ASSESSMENT GUIDELINES

The UST System Closure Assessment Guidelines (guidelines) provide the standard procedure for underground storage tank (UST) system closure in accordance with Rule 1200-1-15-.07. The UST system includes tanks, lines, and ancillary equipment. These guidelines shall be followed unless prohibited by site specific conditions or other applicable statutes, rules or regulations. If these guidelines cannot be followed, then pre-approval of any modification of the guidelines shall be obtained from the appropriate Environmental Assistance Center and these changes shall be documented in the Permanent Closure Report.

Tennessee Code Annotated (T.C.A) §68-215-103(16) defines Responsible Party as the owner and/or operator of a petroleum site or any person who at the time of the release which caused the contamination was an owner and/or operator of a petroleum underground storage tank.

If closing chemical tanks, contact the Division of Solid Waste Management at (615) 532-0780.

I. BEFORE BEGINNING ANY WORK:

- A. The UST system Responsible Party (RP) shall complete and submit the original Application for Permanent Closure of Underground Storage Tank Systems to the appropriate Environmental Assistance Center 30 days prior to the closure. For UST systems that meet current compliance standards, the application is valid for twelve months from the approval date. **In accordance with Rule 1200-1-15-.07(1)(c), substandard UST systems shall be permanently closed immediately.**
- B. Notify the local fire department or State Fire Marshal's office of the permanent closure. Local fire departments may have additional requirements.
- C. Appropriate sample containers and instructions for collecting and preserving the samples shall be obtained from the laboratory, and shall be followed throughout the sampling procedure(s). The required analyses are listed below:
 - 1) If the UST system has stored gasoline or other low boiling point petroleum hydrocarbons, then analyses for MTBE, Benzene and Gasoline Range Organics (GRO) is required for soil and/or ground water samples. Method 8260B and Tennessee GRO Method shall be used.

- 2) If the UST system has stored diesel, kerosene, waste oil or other high boiling point petroleum hydrocarbons, the Tennessee Extractable Petroleum Hydrocarbon Method shall be used for soil and/or ground water samples.
 - 3) If the UST system(s) has stored a combination of petroleum hydrocarbons (gasoline, diesel, waste oil, other) or if the contents are unknown, the analyses in both items "1)" and "2)" are required. Total Petroleum Hydrocarbons (TPH) shall be reported as the sum of GRO and EPH.
- D. For UST system Closure-in-place, refer to Section IV below.
- E. Contact the appropriate Environmental Assistance Center at least one working day prior to implementing any closure activities and/or sampling events.

II. GENERAL REQUIREMENTS DURING UST SYSTEM CLOSURES

A. SAMPLE COLLECTION

1. **Composite samples are not acceptable.**
2. All soil samples for laboratory analysis shall be obtained from depths specified in Sections III. and IV, below. Samples shall be collected, based upon observation and/or field screening results, from the zone of highest suspected contamination. To avoid cross-contamination, a decontaminated hand auger, scoop, or other sampling device shall be used to collect a fresh un-volatilized soil sample. Clean, disposable, latex gloves shall be worn during the collection of each sample. The sample shall be immediately packed tightly into a sample jar leaving no voids, labeled and stored at 4°C until delivered to a laboratory.
3. The **original** of all analytical results shall be submitted with the Permanent Closure Report to the appropriate Environmental Assistance Center. Photocopies are not acceptable. All laboratory analysis sheets shall include the following:
 - a) The Tennessee UST Facility ID Number;
 - b) Boring number or location of sample points;
 - c) Date sample was collected;
 - d) Date sample was analyzed;
 - e) Sample depth;
 - f) Parameter (i.e. MTBE, Benzene, GRO, EPH);
 - g) Unit of measurement (Parts Per Million, PPM);
 - h) Analytical Method including dilution factor (if any);
 - i) Authorized laboratory signature; and
 - j) Chain of Custody Form

B. EXCAVATED SOIL MANAGEMENT OPTIONS

1. All excavated material remaining on the site of generation or on a site owned by the RP or subsidiary of the RP shall be placed on plastic, covered with plastic and bermed. If practical, the material should be segregated depending on the soil conditions. If the contaminated material is to be treated on a site owned by a Third Party, contact the Division of Solid Waste Management for approval.
2. Petroleum contaminated material shall be managed in accordance with Technical Guidance Document (TGD)-009, and an Application to Treat Petroleum Contaminated Soil shall be completed and submitted to the appropriate Environmental Assistance Center for approval prior to the implementation of any treatment activities. Proper screening and sampling of the excavated material in accordance with TGD-005 shall be completed prior to proper disposal.

C. BEDROCK ENCOUNTERED

1. If soil contamination above the minimum cleanup level(s) is in contact with bedrock, then a ground water monitoring well shall be installed and ground water shall be sampled. The monitoring well shall be installed immediately adjacent to the area of greatest suspected contamination and in the apparent down-gradient direction. Refer to the Environmental Assessment Guidelines, Section II.D., in the *UST Reference Handbook* for monitoring well installation. All environmental assessment activities and evaluation of the subsurface investigation results shall be directed by a registered professional geologist under the Geologist Act (T.C.A §68-36-101 et. seq.), or a registered professional engineer under the Tennessee Architects, Engineers, Landscape Architects, and Interior Designers Law and Rules (T.C.A §62-201-101 et seq.).
2. A monitoring well construction diagram, detailed boring log (refer to TGD-006, Standard Drilling Log), analytical results and a scaled site map shall be submitted to the appropriate UST Environmental Assistance Center along with the Permanent Closure Report. The site map shall indicate the location of the monitoring well in relation to the entire UST system(s).

D. CONTAMINATION MANAGEMENT OPTIONS

In accordance with the Petroleum Contamination Cleanup Levels in Appendices 4 and 5 of the Tennessee Petroleum Underground Storage Tank Regulations, any material (soil, sand, or rock) with concentrations exceeding 5 PPM Benzene and/or 100 PPM TPH is considered to be impacted. Ground water is impacted if concentrations exceed 0.005-PPM Benzene and/or 0.1-PPM TPH. The local Environmental Assistance Center shall be contacted within 72 hours, in accordance with Rule 1200-1-15-.06(2), to report a confirmed release if soil and/ or ground water contamination exceeds the minimum cleanup levels and/or if free product is encountered. Failure to notify the Division may

affect fund coverage of corrective action costs associated with this release for fund eligible owners and/or operators.

Once a release is confirmed and depending on the type and degree of impact, one of the following procedures shall be completed, with Division approval.

1. Implementation of TGD-011 to determine the applicable soil and/ or ground water cleanup levels; **or**
2. Removal of the UST system and over-excavation of areas of obvious soil contamination; **or**
3. Implementation of initial abatement measures in accordance with the Environmental Assessment Guidelines.

E. RECORD MAINTENANCE

In accordance with Rule 1200-1-15-.07(5), all appropriate closure records shall be maintained for at least 3 years.

III. UST SYSTEM REMOVAL

The removal of an UST system shall follow the procedures outlined in Appendix 6 in the UST Regulations. If any portion of the UST system is to be closed-in-place, refer to Section IV of these Guidelines.

A. TANK EXCAVATION SAMPLING

1. Areas of obvious contamination shall be over-excavated prior to sampling. Contact the appropriate Environmental Assistance Center prior to over-excavating more than 100 cubic yards of material. Soil samples shall be collected after all backfill material is removed from the excavation. Samples shall be obtained from the excavation floor at a depth of one foot below the bottom of the excavation. Based on observation and/or field screening, samples shall be collected from the zone of highest suspected contamination and relative to Figure 1. Refer to Table 1 to determine the appropriate number of samples and sample locations.
2. If water is encountered in the tank excavation, then a water sample shall be collected and submitted to a laboratory for analysis of the appropriate petroleum constituents. A maximum of 500 gallons of water may be removed and properly disposed without notifying the appropriate Environmental Assistance Center. The treatment and disposal of contaminated water is subject to reasonable rates established by the Division. If the water recharges within 24 hours, another water sample shall be collected and submitted to a laboratory for analysis of the appropriate petroleum constituents.

3. If the UST system is installed in bedrock and if all the backfill material has been excavated and no material can be sampled, a ground water monitoring well shall be installed. The monitoring well shall be installed immediately adjacent to the area of highest suspected contamination. If no obvious area of contamination is evident, the monitoring well shall be installed immediately adjacent to the tank excavation at the junction of the piping trench. Refer to the Environmental Assessment Guidelines, Section II.D., in the *UST Reference Handbook* for monitoring well installation. A registered professional geologist or registered professional engineer shall direct all environmental assessment activities and evaluation of the subsurface investigation data.

TABLE 1 - TANK EXCAVATION SAMPLING

TOTAL TANK STORAGE CAPACITY(GAL.)PER PIT	MINIMUM NUMBER OF SAMPLES	LOCATION
1120 OR LESS	2	SEE FIGURE 1
1121 TO 15,000	4	SEE FIGURE 1
15,001 TO 30,000	5	SEE FIGURE 1
30,001 TO 45,000	6	SEE FIGURE 1
45,001 TO 60,000	7	SEE FIGURE 1
GREATER THAN 60,000 APPROVED ON A SITE-SPECIFIC BASIS		

B. PRODUCT LINE TRENCH SAMPLING

1. If product lines are removed during closure, a sample(s) shall be collected in accordance with Table 2 below for each line trench. Sample(s) shall be collected from a depth of one foot below the bottom of the line trench into undisturbed soil or at the soil/bedrock interface, whichever occurs first. Based on observation and/or field screening, sample(s) shall be collected from the zone of highest suspected contamination.
2. Sampling of line trenches less than 15 feet is not required if other samples are collected at the tank-hold and/or dispensers.
3. For line closure and/or replacement only, line trench sampling shall be required in accordance with Table 2.

TABLE 2 – PRODUCT LINE TRENCH SAMPLING

TOTAL TRENCH LENGTH (FEET)	MINIMUM NUMBER OF SAMPLES	
15 OR LESS	0	(if other samples are collected during closure)
15 OR LESS	1	(line closure only)
16 TO 30	1	
31 TO 60	2	
61 TO 90	3	
91 TO 120	4	
GREATER THAN 120 FEET APPROVED ON A SITE-SPECIFIC BASIS		

C. DISPENSER SAMPLING

If dispensers are removed during closure, sample(s) shall be collected below each dispenser. Sample(s) shall be collected from a depth of one foot below the bottom of the dispenser excavation or at the soil/bedrock interface, whichever occurs first. Based on observation and/or field screening, sample(s) shall be collected from the zone of highest suspected contamination.

IV. UST SYSTEM CLOSURE-IN-PLACE

A. PROPERTY OWNER PERMISSION

If the RP is not the property owner, then a **notarized approval statement from the property owner shall be included** with the Application for Permanent Closure of Underground Storage Tank Systems. The statement shall include the facility address, tax map, and parcel number.

B. TANKHOLD SAMPLING

1. Closing an UST system in-place requires utilizing soil boring or direct-push tools capable of collecting soil samples. Split-spoon samplers, hand augers, or shelby tubes shall be used to retrieve the samples from the required depth. Sampling of hollow-stem auger cuttings is unacceptable for laboratory analysis.
2. All soil samples for laboratory analysis shall be obtained from a depth of one foot below the bottom of the tank. Refer to Table 3 to determine the appropriate number of samples and sample locations.
3. If bedrock or water is encountered before completing the requirements described above in IV.B.2., then a ground water monitoring well shall be installed and sampled. The monitoring well shall be installed immediately adjacent to the tank pit at the junction of the piping trench. Refer to the Environmental Assessment Guidelines,

Section II.D., in the *UST Reference Handbook* for monitoring well installation. A registered professional geologist or a registered professional engineer shall direct all environmental assessment activities and evaluation of the subsurface investigation data.

TABLE 3 – TANKHOLD SAMPLING (CLOSURE-IN-PLACE)

TOTAL TANK STORAGE CAPACITY(GAL.)PER PIT	MINIMUM NUMBER OF SAMPLES	LOCATION
1120 OR LESS	2	SEE FIGURE 2
1121 TO 15,000	4	SEE FIGURE 2
15,001 TO 30,000	6	SEE FIGURE 2
30,001 TO 45,000	8	SEE FIGURE 2
45,001 TO 60,000	10	SEE FIGURE 2
GREATER THAN 60,000 APPROVED ON A SITE-SPECIFIC BASIS		

C. PRODUCT LINE TRENCH SAMPLING

1. If product lines are not removed during closure, a boring(s) shall be placed in accordance with Table 4 below for each line trench. This boring(s) shall be placed no more than three (3) feet from any line trench and advanced to a depth of six (6) feet below the ground surface or to the soil/bedrock interface, whichever occurs first. Sample(s) shall be collected from the zone of highest suspected contamination as determined by the field screening results.
2. Sampling of line trenches less than 15 feet is not required if other samples are collected at the tank-hold and/or dispensers.
3. For line closure and/or replacement only, line trench sampling shall be required in accordance with Table 4.

TABLE 4 – PRODUCT LINE TRENCH SAMPLING

TOTAL TRENCH LENGTH (FEET)	MINIMUM NUMBER OF BORINGS	
15 OR LESS	0	(if other samples are collected during closure)
15 OR LESS	1	(line closure only)
16 TO 30	1	
31 TO 60	2	
61 TO 90	3	
91 TO 120	4	
GREATER THAN 120 FEET APPROVED ON A SITE-SPECIFIC BASIS		

D. DISPENSER SAMPLING

If dispensers are not removed during closure, a boring shall be placed no more than three (3) feet from any line trench and advanced to a depth of six (6) feet below the ground surface or to the soil/bedrock interface, whichever occurs first. Sample(s) shall be collected from the zone of highest suspected contamination as determined by the field screening results.

E. COMPLETING THE UST SYSTEM CLOSURE-IN-PLACE

Complete this section once the soil and/or ground water has been determined to be below the applicable cleanup levels in accordance with Appendix 4 and Appendix 5 in Rule 1200-1-15.

Local ordinances that apply to the closure-in-place of underground storage tank (UST) systems shall be followed. Below are the closure-in-place procedures. A permanent record of the UST system location, date of closure, and method of closure-in-place shall be maintained for a minimum of three years.

When properties are sold or transferred, the new owners or new leaseholders should be informed of the presence of UST systems that are closed-in-place.

If petroleum contamination is not encountered or is below the established cleanup levels, follow the procedures as outlined below:

1. Remove and properly dispose of all product from the piping and tank(s).
2. Remove and properly dispose of all sludge and drop tube(s) from the tank(s).
3. Disconnect and cap all piping not used during purging procedures. The vent line shall remain open and connected until the tank is filled with an inert solid material.
4. The tank atmosphere shall be purged and regularly tested in accordance with the provisions in Appendix 6 (2) and (3) of the regulations.
5. Fill the tank with an inert solid material as indicated below:
 - a. Sand: Dry sand may be added to the tank as long as it flows freely. Once the tank is nearly full, a sand/water slurry shall then be used to completely fill the tank until the fill pipe is full.
 - b. Sand/Soil: The tank may be filled to 80% of its capacity with sand. A free-flowing mixture of sand/soil shall then be used to completely fill the tank until the fill pipe is full.

- c. Concrete: A free-flowing concrete slurry may be used to completely fill the tank until the fill pipe is full.
 - d. Concrete/Bentonite: A free-flowing concrete/bentonite slurry may be used to completely fill the tank until the fill pipe is full.
- 6. Other inert solid material may be used if approved by Division personnel. Foam or water are not acceptable materials.
 - 7. Disconnect and cap the vent line.

FIGURE 1

SAMPLE LOCATIONS FOR UST REMOVAL

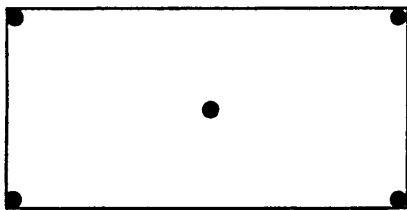
1,120 gal. or LESS



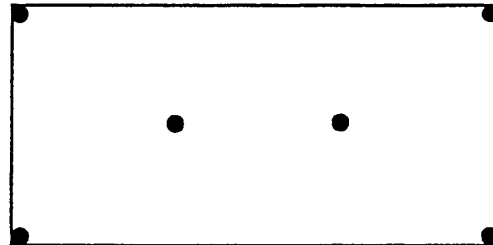
1,121 to 15,000 gal.



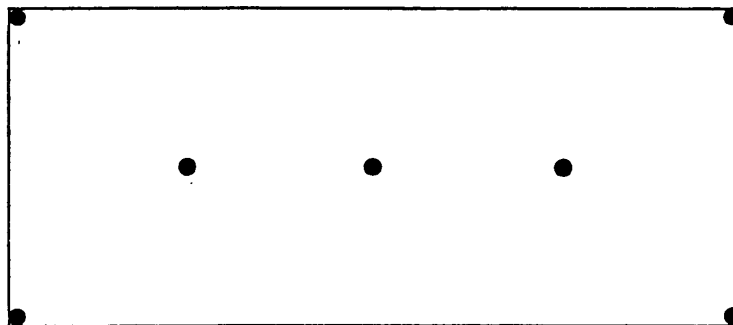
15,001 to 30,000 gal.



30,001 to 45,000 gal.



45,001 to 60,000 gal.



● - Sampling point

FIGURE 2

SAMPLE LOCATIONS FOR UST CLOSURE - IN - PLACE

